# *Clostridioides difficile*

## DEATHS AMONG MICHIGAN RESIDENTS

## 2017-2021

### WHAT IS CLOSTRIDIOIDES DIFFICILE?

*Clostridioides difficile* (*C. difficile*), previously known as *Clostridium difficile*, is a bacterium that causes a range of disease, from asymptomatic colonization to severe diarrhea, colitis, toxic megacolon, bowel perforation, and death. It is the most common type of healthcare-associated infection (HAI) related to antibiotic use, with estimates indicating that almost half a million infections occur in the U.S. each year.[2, 3, 4] 1 in 11 people over age 65 who are diagnosed with a *C. difficile* infection die within one month.[1]

From the years of 2017 to 2021, there were[1] a total of 998 deaths for which *C. difficile* played a contributing role. *C. difficile* was the main cause of death for 608 deaths and a related cause of death for 390 deaths.

### DATA SOURCES

Data in this fact sheet are taken from the Michigan Resident Death Files for the years 2017-2021, Division of Vital Records and Health Statistics, and the Michigan Department of Health and Human Services (MDHHS). *C. difficile* deaths were classified as such if *C. difficile* was listed as the main cause of death or included in the top 5 related cases of death in death certificate data. To calculate rates, census data were used from the United States Census Bureau for each respective population and year. To calculate rates for 2020, 5-year estimates were used for 2016-2020 since the Census did not provide 1-year estimates for 2020. To estimate county rates, a 5-year estimate was obtained using data from 2017-2021 for both MDHHS and Census data. The population of Detroit was excluded from Wayne County to calculate their rates separately. Data cleaning, formatting, wrangling, validation, and statistical analysis was done using RStudio, a statistical software.

1

### *C. difficile* Death Rates per 100,000 in Michigan (2017-2021)

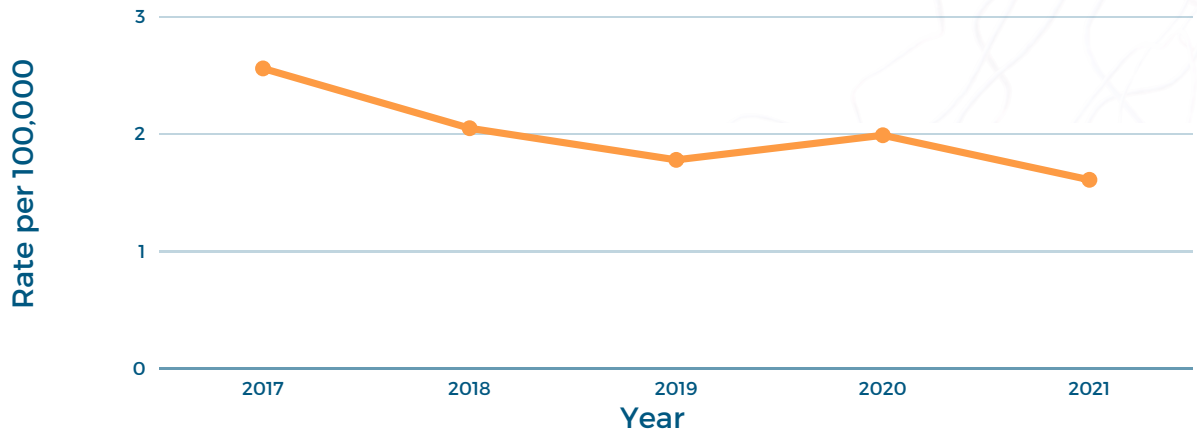


FIGURE 1

Mortality due to *C. difficile* had a downward trend, despite an uptick in 2020.

**1 in 11 people over 65 years old die within one month**

**0.5M**

**Almost half a million infections each year**

**Contagious**

## 2 *C. difficile* Death Rates by Sex per 100,000 Michigan Residents (2017-2021)

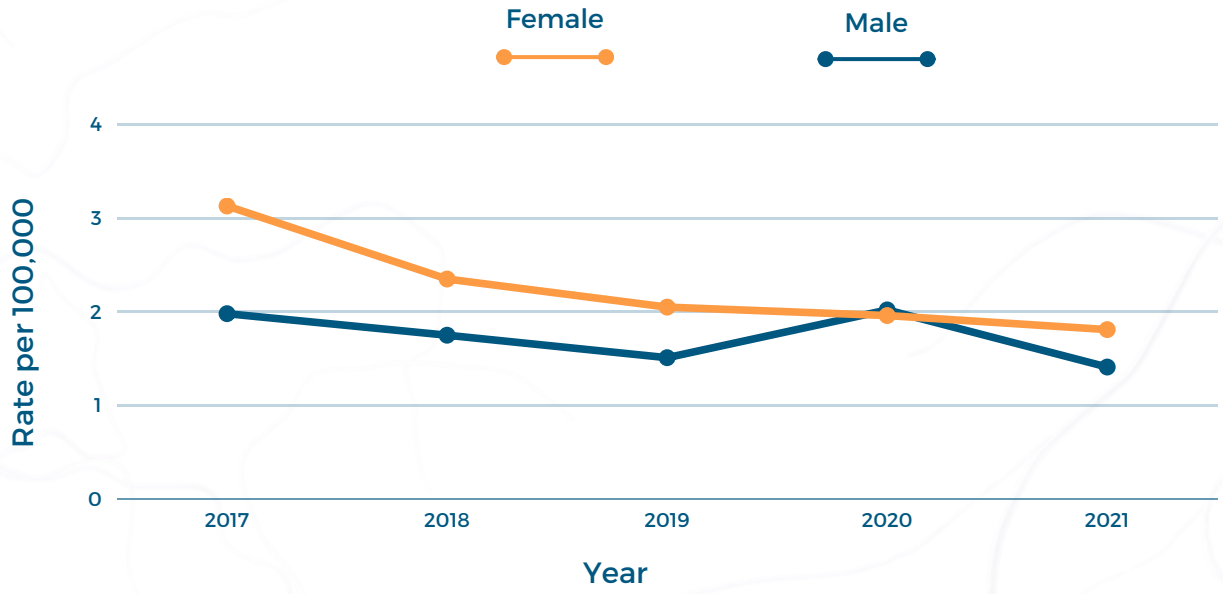


**FIGURE 2**

Mortality due to *C. difficile* remained higher among females compared to males, except for 2020.

## 3 *C. difficile* Death Rates by Age per 100,000 Michigan Residents (2017-2021)

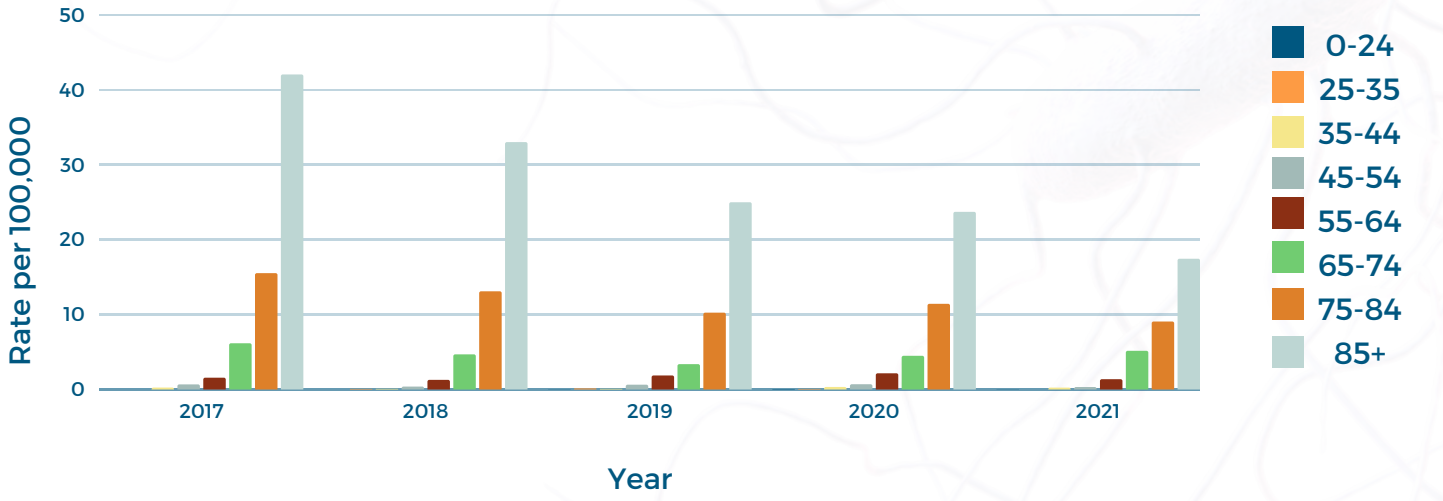


**FIGURE 3**

Mortality due to *C. difficile* is shown to be higher among persons 85+. Some risk factors include increased exposure to healthcare settings, increased antibiotic use, and impaired immune response.

## 4 Death Rates of *C. difficile* Infection in Michigan by Race (2017-2021)

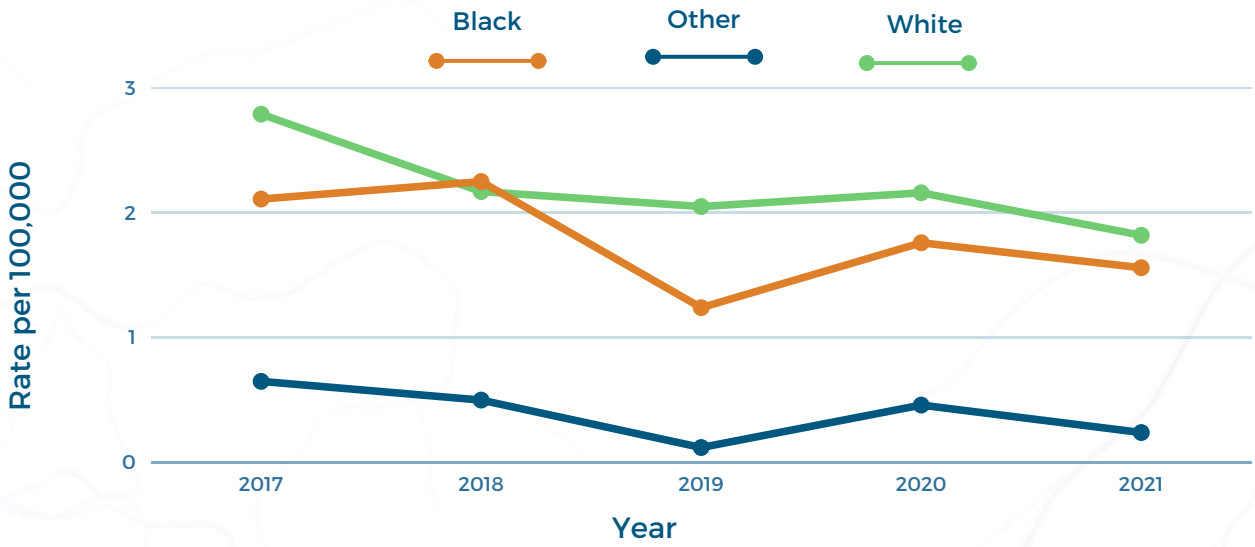


FIGURE 4

For the years observed, mortality due to *C. difficile* was higher among the White population in Michigan, except for 2018, where a slight increase in *C. difficile* deaths in the Black population exceeded the rate of the White population.

## 5 *C. difficile* Death Rates in Michigan by County per 100,000 – 2017-2021

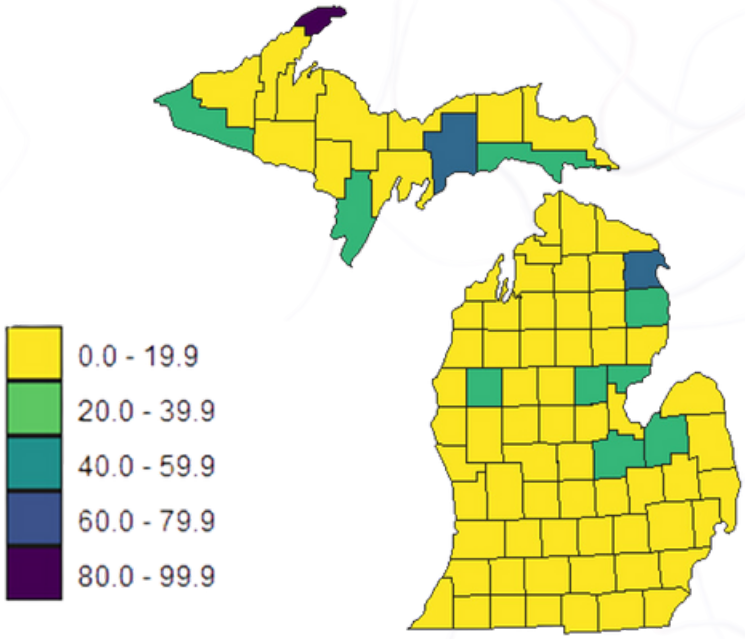


FIGURE 5

Mortality rates due to *C. difficile* are shown by County. Ottawa County, for example, would experience 0 to 19.9 *C. difficile* deaths per 100,000 people in a 5-year span. In contrast, Mackinac County would see 20-39.9 deaths per 100,000 people over the period of 5 years. The rate of Detroit ranged from 0 - 19.9 deaths per 100,000.

## Key Findings

*C. difficile* deaths were shown to be higher in the following demographics:

- Female
- White
- Older adults

Other risk factors related to *C. difficile* death include hospitalization or extended hospitalization as well as greater access to healthcare, which result in increased antimicrobial exposure (e.g., antibiotics).[5] Further analysis is needed to identify the determinants of *C. difficile* mortality.

## Limitations

1. Rates are crude rates (total number of deaths, divided by the total population of interest, and multiplied by 100,000) and do not adjust for age.

2. The limited data did not allow for analysis of other factors known to be related to *C. difficile* morbidity and mortality.

3. There were missing/unknown values for some demographic variables.

## References


1. *Centers for Disease Control and Prevention. (2021). C. diff (Clostridioides difficile). Centers for Disease Control and Prevention. Retrieved June 30, 2023, from https://www.cdc.gov/cdiff/index.html.*
2. *Centers for Disease Control and Prevention. (2022). Clostridioides difficile Infection (CDI) Tracking. Centers for Disease Control and Prevention. Retrieved June 30, 2023, from https://www.cdc.gov/hai/eip/cdiff-tracking.html#:~:text=Clostridioides%20difficile%20infection%20(CDI)%20is,infections%20in%20the%20United%20States.*
3. *Centers for Disease Control and Prevention. (2022). FAQs for Clinicians about C. diff. Centers for Disease Control and Prevention. Retrieved June 30, 2023, from FAQs for Clinicians about C. diff. Centers for Disease Control and Prevention. Retrieved June 30, 2023, from Centers for Disease Control and Prevention. (2022). C. difficile Infections. Retrieved June 8, 2022, from https://arpsp.cdc.gov/profile/nhsn/cdi. .*
4. *Centers for Disease Control and Prevention. (2022). What is C. diff? Centers for Disease Control and Prevention. Retrieved June 30, 2023, from https://www.cdc.gov/cdiff/what-is.html#:~:text=diff%20(also%20known%20as%20Clostridioides,6%20patients%20who%20get%20C.*
5. *Centers for Disease Control and Prevention. (2022) Your Risk of C. diff. Centers for Disease Control and Prevention. Retrieved June 8, 2022, from https://www.cdc.gov/cdiff/risk.html.*


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